

CLAIMS

1. A method of producing a I-III-VI_y compound in thin film form by electrochemistry, in which y is close to 2 and VI is an element comprising selenium, of the type comprising the following steps:
- 5 a) of providing an electrolysis bath comprising active selenium, in oxidation state IV, and at least two electrodes; and
- 10 b) of applying a potential difference between the two electrodes in order to substantially promote migration of the active selenium toward one of the electrodes and thus initiate the formation of at least one thin film of I-III-VI_y,
- 15 characterized in that it furthermore includes a step c) of regenerating the selenium in active form in said bath, in order to increase the lifetime of said electrolysis bath.
- 20 2. The method as claimed in claim 1, characterized in that, at step c), an oxidizing agent for selenium (Se(0)) is introduced into the bath in order to regenerate selenium in active form (Se(IV)).
- 25 3. The method as claimed in claim 2, characterized in that, when the bath contains selenium in colloid form (Se(0)) at step b), said oxidizing agent is designed to regenerate the selenium in colloid form (Se(0)) to selenium in active form (Se(IV)).
- 30 4. The method as claimed in either of claims 2 and 3, characterized in that said oxidizing agent is hydrogen peroxide (H₂O₂).
- 35 5. The method as claimed in claim 4, characterized in that the concentration of hydrogen peroxide added to the bath is of the order of magnitude corresponding substantially to at least five times the initial

selenium concentration in the bath.

6. The method as claimed in one of claims 1 to 5,
characterized in that, at step c), selenium is added to
5 the bath in order to form an excess of active selenium
in the bath.

7. The method as claimed in claim 6, characterized in
that, for substantially one tenth of the concentration
10 of selenium at step a) consumed by producing at least
one thin film at step b), substantially twice the
consumed concentration is added to the bath at step c).

8. The method as claimed in one of the preceding
15 claims, characterized in that, after step c), at least
one new thin film of I-III-VI_y is formed.

9. The method as claimed in one of the preceding
claims, characterized in that, to produce thin CuInSe_y
20 films, the bath comprises, at step a), for one unit of
concentration of copper in the bath, about 1.7 units of
concentration of active selenium.

10. The method as claimed in one of the preceding
25 claims, characterized in that it includes a step after
step c), of regenerating the electrolysis bath by
introducing oxides and/or hydroxides of elements I
(CuO; Cu(OH)₂) and III (In₂O₃; In(OH)₃).